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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,768	10/20/2003	Yukio Narukawa	AZU.002	9596
20987	7590	10/06/2005		
VOLENTINE FRANCOS, & WHITT PLLC ONE FREEDOM SQUARE 11951 FREEDOM DRIVE SUITE 1260 RESTON, VA 20190				
			EXAMINER	
			TRINH, HOA B	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/687,768

Applicant(s)

NARUKAWA ET AL. 

Examiner

Vikki H. Trinh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 14-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/20/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-13, in the reply filed on 07/13/05 is acknowledged.
2. Claims 14-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group II, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 07/13/05.

Claim Objections

3. Claim 1 is objected to because of the following informalities: In claim 1, lines 10-11, the phrase "active layer formed within and without said recess" is confusing and unclear. The examiner assumes in this Office Action that applicants intend to state that the active layer has a portion formed within the recess and another portion formed outside the recess, as shown in figure 5. Appropriate correction is required.
4. Claim 2 is objected to because of the following informalities: In claim 2, line 1, "said semiconductor layers" should be "the semiconductor layers". Appropriate correction is required.
5. Claim 7 is objected to because of the following informalities: In claim 7, line 4, "the gallium" should be "a gallium". Appropriate correction is required.
6. Claim 8 is objected to because of the following informalities: In claim 8, line 4, "the gallium" should be "a gallium". Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-8, 10-11, 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Romano et al. (6,285,698) (hereinafter (Romano)).

As to claim 1, Romano discloses a semiconductor light-emitting device (fig. 4), comprising a substrate 210 (fig. 4) and a first electrically conductive type semiconductor layer 250 (fig. 4) or layers 250, 240, 230 (fig. 4), an active layer 310 (fig. 4) and a second electrically conductive type semiconductor layer 320 (fig. 4) or layers 320, 330, 340 (fig. 4) stacked on a major surface of the substrate 210 (fig. 4), wherein: a major surface of the first electrically conductive type semiconductor layer 250 (fig. 4) is provided with a recess 255 (fig. 3 and fig. 4), and the first electrically conductive type semiconductor layer 2502 (fig. 4) is contiguous to the active layer 310 (fig. 4) formed “within and without” said recess 255 (fig. 3 and fig. 4) in two or more plane orientations.

As to claim 2, Romano discloses the semiconductor layers 250, 320 (fig. 4) and said active layer 310 (fig. 4) are each a gallium nitride semiconductor layer (col. 3, lines 45-55, col. 4, lines 60-65, col. 5, lines 30-55).

As to claim 3, Romano discloses that the first electrically conductive type 250 (fig. 4) is an n-type (col. 4, lines 60-65, col. 5, lines 45-55) and the second electrically conductive type 320 (fig. 4) is a p-type (col. 3, lines 45-55, col. 5, lines 35-40).

As to claim 4, Romano discloses that the active layer 310 (fig. 4) has a quantum well structure including a well layer comprising an In-containing gallium nitride semiconductor (col. 5, lines 30-35).

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As to claim 5, Romano discloses that at least one of surfaces of the first electrically conductive type semiconductor layer 250 (fig. 4) contiguous to the active layer 310 (fig. 4) defines the major surface of the first electrically conductive type semiconductor layer 250 (fig. 4).

As to claim 6, Romano discloses that at least one of surfaces of the first electrically conductive type semiconductor layer 250 (fig. 4) contiguous to the active layer 310 (fig. 4) is a surface vertical to the major surface of the first electrically conductive type semiconductor layer 250 (fig. 4).

As to claim 7, Romano discloses that the major surface of the first electrically conductive type semiconductor layer 250 (fig. 4) may be called a "C" plane of the gallium nitride semiconductor (fig. 4, and col. 4, lines 60-65). Note that the plane's label "C" is inherently included. Also note that the gallium nitride layer is interpreted to be the first conductive layers.

As to claim 8, Romano discloses the surface vertical to the major surface of the first electrically conductive type semiconductor layer 250 (fig. 4) may be called an "A" or "M" plane of a gallium nitride semiconductor (fig. 4, and col. 4, lines 60-65). Note that the plane's label "A" or "M" is inherently included. Also note that the gallium nitride layer is interpreted to be the first conductive layers.

As to claim 10, Romano shows that the active layer 310 (fig. 4) may inherently include a striped M or A plane, as viewed from an upper surface of the first conductive type semiconductor layer having a recess 255 (fig. 3 and fig. 4). Note the configuration of the active layer relative to the first conductive layer as shown in figures 3-4.

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As to claim 11, Romano shows that the active layer 310 (fig. 4) comes in contact with the second conductive type semiconductor layer 320 (fig. 4) in a plane orientation contiguous to the first electrically conductive type semiconductor layer 250 (fig. 3 and fig. 4).

As to claim 13, Romano teaches that the active layer 310 (fig. 4) emits light components having two or more different major peak wavelengths (col. 2, lines 45-55), in which the light components are mixed to show a color.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Romano, as applied to claim 1 above.

Romano discloses the invention substantially as claimed. However, Romano does not explicitly teach that the M or A planes of the active layer make an angle of 30, 60, 90, 120, 150, 210, 240, 270, 300, or 330 degrees, as viewed from the upper surface of the first conductive layer 250 (fig. 4) having a recess 255 (fig. 3). Nonetheless, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Romano with the active layer having M or A planes that make a specific angle of 30, 60, 90, 120, 150, 210, 240, 270, 300, or 330 degrees, as viewed from the upper surface of the first conductive layer with the recess, since it is a prima facie of obvious to an artisan for routine optimization and experimentation to configure the planes with the specific angle, as claimed, because applicants have not yet established any criticality for the specific angle. Note that the specification contains no disclosure of either the critical nature of the claimed angle of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. (In re Woodruff, 919 F.2d 1575, 1578 (Fed. Cir. 1990).)

13. Claim 12 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Romano, as applied to claim 1 above.

As to claim 12, Romano discloses a first electrode 410 (fig. 4) is formed on at least a part of a surface of the first conductive type layer 230 (fig. 4), the surface being exposed, and a

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second electrode 420 (fig. 4) is formed on at least a part of the surface of the second conductive type layer 340 (fig. 4). However, Romano does not explicitly teach that the surface is exposed by etching of the second electrically conductive type semiconductor layer and the active layer. Nonetheless, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Romano with the step of etching the second conductive layer and the active layer to expose the surface of the first conductive layer, as claimed, because the patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F. 2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kano '275 discloses an LED having GaN semiconductor layers (fig. 1).


Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Vikki Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Wael Fahmy, can be reached at (571) 272-1705. The office fax number is 703-872-9306.

Any request for information regarding to the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Also, status information for published applications may be obtained from either Private PAIR or Public Pair. In addition,

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status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. If you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Lastly, paper copies of cited U.S. patents and U.S. patent application publications will cease to be mailed to applicants with Office actions as of June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy. Requests to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.


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